<u>WHAT IS CLAIMED IS:</u>

1. A gain equalized optical system, comprising:

a wavelength division demultiplexer operable to separate a multiple wavelength signal into a plurality of wavelength signals;

a first beam splitter operable to receive at least one of the plurality of wavelength signals as an optical input signal, and to communicate at least a first part of the optical input signal in a first path and a second part of the optical input signal in a second path, wherein the first part and the second part of the optical input signal comprise unequal amplitudes;

a micro-electro-optic system (MEMS) device comprising a moveable mirror layer operable to receive the first part of the optical input signal from the first beam splitter and to reflect the first part to an output port to form an output signal, the amplitude of the output signal capable of being varyied depending on the displacement of the moveable mirror layer; and

a wavelength division multiplexer operable to receive a plurality of output signal wavelengths and to multiplex at least some of the output signal wavelengths into an optical output signal.

2. The optical system of Claim 1, wherein the first part of the optical input signal is combined with the second part of the optical input signal at the output port to form the output signal.

3. The optical system of Claim 1, wherein the moveable mirror layer experiences a substantially piston-like motion to change its position relative to the first

beam splitter.

4. The optical system of Claim 1, wherein the moveable mirror layer includes a plurality of adjacent mirror strips.

5. The optical system of Claim 1, wherein the first beam splitter is selected from the group consisting of a partially silvered mirror, a mirror having at least one layer of a dielectric coating, and a fiber coupler.

6. The optical system of Claim 1, wherein the MEMS device comprises:

an inner conductive layer disposed inwardly from the moveable mirror layer and forming a space between the moveable mirror layer and the inner conductive layer;

wherein the moveable mirror layer comprises an at least substantially conductive structure operable to move relative to the inner conductive layer in response to a voltage difference between the moveable mirror layer and the inner conductive layer.

7. The optical system of Claim 6, wherein the moveable mirror layer is operable to facilitate variable attenuation by selectively moving a distance relative to the inner conductive layer.

8. A method of facilitating gain equalization of a plurality of wavelengths, the method comprising:

receiving an optical input signal comprising a plurality of wavelengths;

separating, using a first beam splitter, at least one of the plurality of wavelengths of the optical input signal into a first part and a second part, wherein the first part comprises an amplitude that is different than an amplitude of the second part;

communicating at least a portion of the first part to a plurality of attenuators;

at one or more of the attenuators:

communicating at least the first part toward a moveable mirror layer of a micro-electro-optic system (MEMS) device;

reflecting the first part toward an output to form at least one output signal; and

displacing the moveable mirror layer to cause a change in the amplitude of the output signal relative to the amplitude of the at least one of the plurality of wavelengths of the optical input signal.

9. The method of Claim 8, wherein the first part is combined with the second part at the output port to form the output signal.

10. The method of Claim 8, wherein the moveable mirror layer experiences a substantially piston-like motion to change its position relative to the first beam splitter.

11. The method of Claim 8, wherein the first beam splitter is selected from the group consisting of a partially silvered mirror, a mirror having at least one layer of a dielectric coating, and a fiber coupler.

12. The method of Claim 8, wherein the MEMS device comprises:

an inner conductive layer disposed inwardly from the moveable mirror layer and forming a space between the moveable mirror layer and the inner conductive layer;

wherein the moveable mirror layer comprises an at least substantially conductive structure operable to move relative to the inner conductive layer in response to a voltage difference between the moveable mirror layer and the inner conductive layer.

13. The method of Claim 12, wherein the moveable mirror layer is operable to facilitate variable attenuation by selectively moving a distance relative to the inner conductive layer.

14. The method of Claim 8, wherein the moveable mirror layer includes a plurality of adjacent mirror strips.

15. A multiple band optical communication system, comprising:

a plurality of optical amplifiers, each operable to receive and amplify at least one of a plurality of communication bands, each communication band comprising a plurality of wavelengths;

a first beam splitter operable to receive an optical input signal residing in at least one of the communication bands, and to communicate at least a first part of the optical input signal in a first path and a second part of the optical input signal in a second path, wherein the first part and the second part of the optical input signal comprise unequal amplitudes; and

a gain equalizer coupled to at least one of the plurality of optical amplifiers, the gain equalizer operable to receive at least one of the plurality of amplified wavelengths and to selectively introduce attenuation or gain into the at least one of the plurality of amplified wavelengths, wherein the gain equalizer comprises:

a wavelength division demultiplexer operable to separate one or more communication bands into a plurality of wavelengths;

a micro-electro-optic system (MEMS) device comprising a moveable mirror layer operable to receive the first part of the input signal and to reflect the first part of the input signal toward an output to form an output signal, the amplitude of the output signal varying depending on the displacement of the moveable mirror layer; and

a wavelength division multiplexer operable to receive a plurality of output signal wavelengths and

to multiplex at least some of the output signal wavelengths into an optical output signal.

16. The optical communication system of Claim 15, wherein the first part is combined with the second part at the output port to form the output signal.

17. The optical communication system of Claim 15, wherein the moveable mirror layer experiences a substantially piston-like motion to change its position relative to the first beam splitter.

18. The optical communication system of Claim 15, wherein the first beam splitter is selected from the group consisting of a partially silvered mirror, a mirror having at least one layer of a dielectric coating, and a fiber coupler.

19. The optical communication system of Claim 15, wherein the MEMS device comprises:

an inner conductive layer disposed inwardly from the moveable mirror layer and forming a space between the moveable mirror layer and the inner conductive layer;

wherein the moveable mirror layer comprises an at least substantially conductive structure operable to move relative to the inner conductive layer in response to a voltage difference between the moveable mirror layer and the inner conductive layer.

20. The optical communication system of Claim 19, wherein the moveable mirror layer is operable to facilitate variable attenuation by selectively moving a

distance relative to the inner conductive layer.

21. The optical communication system of Claim 15, wherein the moveable mirror layer includes a plurality of adjacent mirror strips.